

Unit 9

Day 3

More Equations with Radicals

$$1) (\sqrt{y})^2 = (\sqrt{y-5} + 1)^2$$

$$y = y - 5 + 2\sqrt{y-5} + 1 \quad \sqrt{y} - \sqrt{y-5} = 1$$

$$4 = 2\sqrt{y-5}$$

$$2 = \sqrt{y-5}$$

$$4 = y - 5$$

$$9 = y$$

$$\sqrt{9} = \sqrt{9-5} + 1$$

$$3 = 2 + 1 \quad \checkmark$$

$$2) \quad (\sqrt{x+2})^2 = (\sqrt{4+7\sqrt{x}})^2$$

$$x + 4\sqrt{x} + 4 = 4 + 7\sqrt{x}$$

$$x = 3\sqrt{x}$$

$$x^2 = 9x$$

$$x^2 - 9x = 0$$

$$x(x-9) = 0$$

$$x=0 \quad x=9$$

$$3+2=\checkmark 5$$

3)

$$\sqrt{3-x} + \sqrt{3+x} = x$$

$$(\sqrt{3-x})^2 = (x - \sqrt{3+x})^2$$

$$3-x = x^2 - 2x\sqrt{3+x} + 3+x$$

$$-x^2 - 2x = -2x\sqrt{3+x}$$

$$(x^2 + 2x)^2 = (2x\sqrt{3+x})^2$$

$$x^4 + 4x^3 + 4x^2 = 4x^2(3+x)$$

$$x^4 + 4x^3 + 4x^2 = 12x^2 + 4x^3$$

$$x^4 - 8x^2 = 0$$

$$x^2(x^2 - 8) = 0$$

$$x=0 \quad | \quad \begin{array}{l} x^2=8 \\ x=\pm 2\sqrt{2} \end{array}$$

$$\{\cancel{0}, 2\sqrt{2}\}$$

$$\begin{array}{l} x\sqrt{3+x} \\ x\sqrt{3+x} \end{array}$$

$$3\sqrt{2}$$

$$+ 2\sqrt{2}$$

$$4) \quad (3m+7)^{\frac{2}{3}} = (m+3)^{\frac{1}{3}}$$

$$\left(\sqrt[3]{(3m+7)^2} \right)^3 = \left(\sqrt[3]{m+3} \right)^3$$

$$(3m+7)^2 = m+3$$

$$3m+7 = \sqrt[3]{m+3}$$

$$9m^2 + 42m + 49 = m + 3$$

$$9m^2 + 41m + 46 = 0$$

$$(9m+23)(m+2) = 0$$

$$m = \frac{-23}{9} \quad | \quad m = -2$$

HOMEWORK: p. 137: 33-38, 43, 44, extra problems

Extra Problems:

$$1) \sqrt{x+4} - \sqrt{x+3} = \sqrt{3x+10}$$

$$2) \sqrt{3\sqrt{2m+3}} = \sqrt{5m-6}$$

$$3) 3 - \sqrt{x} = \sqrt{2\sqrt{x} - 3}$$

$$4) (2k-9)^{-\frac{2}{3}} + 4(2k-9)^{\frac{1}{3}} = 0$$